

First records of *Epigonus denticulatus* (Perciformes: Epigonidae) in the northern waters of Spain: northernmost occurrences in the eastern North Atlantic

by

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RÉSUMÉ. - Premiers signalements d'*Epigonus denticulatus* (Perciformes, Epigonidae) dans les eaux du nord de l'Espagne, les plus septentrionaux en Atlantique nord-est.

Vingt-deux spécimens d'*Epigonus denticulatus* ont été collectés lors de chalutages benthiques (364-639 m de profondeur) en mer cantabrique, le long des côtes espagnoles. Ces signalements représentent une nouvelle limite septentrionale de la répartition d'*E. denticulatus* dans l'Atlantique nord-est.

Key words. - Epigonidae - *Epigonus denticulatus* - Eastern North Atlantic - Galician waters - Cantabrian Sea - New record.

The deepwater cardinalfishes genus *Epigonus* Rafinesque, 1810 has been successively assigned first to the family Apogonidae (Tortones, 1986) and later to the family Epigonidae (Johnson, 1993; Froese and Pauly, 2011). This genus contains 30 valid species (Okamoto and Motomura, 2011) but only three of them have been found in the northern Atlantic (Tortones, 1986; Froese and Pauly, 2011), viz., *Epigonus constanciae* (Giglioli, 1880), *Epigonus denticulatus* Dieuzeide, 1950, and *Epigonus telescopus* (Risso, 1810).

Twenty-two specimens of *E. denticulatus* (Fig. 1) were caught between 364 and 639 m depth (Tab. I, Fig. 2) during the bottom trawl surveys conducted every autumn (September-October) by the Instituto Español de Oceanografía (IEO) on the northern continental shelf of Spain since 1983 (Sánchez, 1993). Only six specimens from the 2009 survey were conserved, and meristic and morphometric characters recorded following Mayer (1974), except for the body width and body depth (Okamoto and Motomura, 2011) (Tab. II). The specimens were fixed in 10% formalin, preserved in 70% alcohol and stored in the fish collection of the Instituto Español de Oceanografía in Santander (IEOST09020-09025).

The six specimens of *E. denticulatus* showed the main distinctive morphological and meristic characters pointed out by Mayer (1974) and Abramov (1992): fusiform body, slightly compressed and moderate to shallow, depth 16-24% SL; head moderate with eyes round or slightly oval; snout short, blunt; mouth large, oblique and terminal with teeth small and conical; opercular spine absent but bearing instead jagged membranous spines on its upper edge; total gill rakers 26-34; caudal peduncle narrow and elongated, length 25-32% SL; 10-14 pyloric caeca; 46 to 49 lateral-line scales, large, ctenoid and most of them removed by trawling. The fresh fishes were grayish brown over body and silvery on belly with underlying tissue pink-brown; mouth cavity light and branchial region dark.



Figure 1. - *Epigonus denticulatus* (155 mm TL) caught in the Cantabrian Sea.

Table I. - Records of *Epigonus denticulatus* in Galician and the Cantabrian Sea waters (North-eastern Atlantic).

Date	Position		Depth (m)	Number
	Latitude	Longitude		
11 Oct. 1996	43°52'54N	6°28'08W	571	2
17 Oct. 1996	43°42'09N	4°31'06W	529	1
05 Oct. 2003	43°57'43N	8°33'40W	364	1
26 Sep. 2005	43°40'56N	8°50'60W	530	1
26 Sep. 2006	42°16'59N	9°27'42W	629	1
04 Oct. 2006	43°40'49N	8°51'34W	549	1
18 Oct. 2007	43°40'37N	8°52'45W	535	4
14 Oct. 2008	43°56'10N	5°29'48W	639	1
20 Sep. 2009	42°11'46N	9°26'34W	612	1
01 Oct. 2009	43°58'12N	8°39'13W	444	2
06 Sep. 2009	43°40'50N	6°51'21W	540	2
07 Oct. 2009	43°40'50N	8°52'08W	567	3
05 Oct. 2011	42°15'44N	9°27'52W	590	1
11 Oct. 2011	44°03'04N	8°43'26W	459	1

The number of pyloric caeca is a distinctive feature that can be used to separate *E. denticulatus* from the other two deepwater cardinalfishes found in the area. Thus, *E. denticulatus* has intermediate counts (10-14) compared with *E. constanciae* (6-8) and *E. telescopus* (21-34) (Mayer, 1974; Abramov, 1992).

E. denticulatus has been recorded in the eastern and western Atlantic, western Mediterranean, Pacific and Indian Oceans (Abramov, 1992). In the eastern North Atlantic, it extends along the west coast of Africa to near to the Straits of Gibraltar (Tortones, 1986). It is a bathydemersal species inhabiting the continental slope

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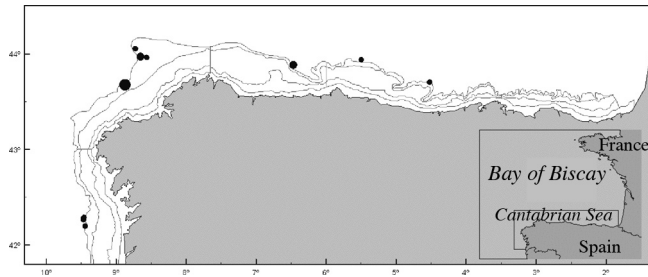


Figure 2. - Geographical distribution of the captures of *Epigonus denticulatus*. A single symbol may indicate more than one capture.

from 200 to 830 m depth, although it occurs usually between 300-600 m (Mayer, 1974; Abramov, 1992).

The morphometric and meristic data from the specimens of *E. denticulatus* described herein are in agreement with anterior

descriptions of the species (Mayer, 1974; Tortonese, 1986; Abramov, 1992).

Up to date, the northern captures of this species were recorded near to the Strait of Gibraltar and these records constitute a new northern limit for the distribution of *E. denticulatus* in the eastern Atlantic. Although the research surveys began in 1983, the species was recorded for the first time in 1996, and its occurrences have intensified since 2003 (19 out of 22) (Tab. I). Northward distribution shifts of marine fishes in Atlantic European waters have been observed in many species and related with ocean warming (Quéro, 1998; Perry *et al.*, 2005). In northern Spain, Galician waters and the Cantabrian Sea, this warming trend seems to be responsible for changes in the pelagic ecology (Valdés *et al.*, 2007) and for the increase of tropical and subtropical fishes occurrences in recent years (Bañón *et al.*, 2002; Arronte *et al.*, 2004). The presence of *E. denticulatus* further north of the Strait of Gibraltar could be another example of this spread of tropical and subtropical fishes.

Table II. - Morphometric and meristic data, and respective body proportions of six specimens of *Epigonus denticulatus* collected in 2009. *: damaged.

	IEOST09020		IEOST09021		IEOST09022		IEOST09023		IEOST09024		IEOST09025	
	Size (mm)	Body proportion (% SL)	Size (mm)	Body proportion (% SL)	Size (mm)	Body proportion (% SL)	Size (mm)	Body proportion (% SL)	Size (mm)	Body proportion (% SL)	Size (mm)	Body proportion (% SL)
Morphometric characters												
Total length (TL)	155		81		83		88		85		66	
Standard length (SL)	125		73		72		78		73		55	
Head length	43	34.4	24	32.9	25	34.7	25	32.1	25	34.2	19	34.5
Snout length	10	8.0	6	8.2	6	8.3	5	6.4	5	6.8	5	9.1
Post-orbital length	16	12.8	9	12.3	9	12.5	10	12.8	10	13.7	6	10.9
Inter-orbital distance	14	11.2	6	8.2	6	8.3	7	9.0	7	9.6	5	9.1
Horizontal orbital diameter	17	13.6	9	12.3	10	13.9	10	12.8	10	13.7	8	14.5
Eye diameter	14	11.2	8	11.0	8	11.1	8	10.3	8	11.0	6	10.9
Maxillar length	19	15.2	9	12.3	10	13.9	10	12.8	10	13.7	8	14.5
Pre-1 st dorsal length	45	36.0	25	34.2	26	36.1	28	35.9	27	37.0	21	38.2
Pre-2 nd dorsal length	70	56.0	39	53.4	40	55.6	42	53.8	41	56.2	30	54.5
Pre-anal length	80	64.0	42	57.5	43	59.7	45	57.7	46	63.0	34	61.8
1 st dorsal fin base	17	13.6	6	8.2	9	12.5	6*	8.2*	9	12.3	2*	3.6*
2 nd dorsal fin base	13	10.4	5	6.9	7	9.7	8	10.3	8	11.0	5	9.1
Anal fin base	10	8.0	7	9.6	7	9.7	8	10.3	6	8.2	4	7.3
Pectoral fin length	22	17.6	7	9.6	8	11.1	7	9.0	7	9.6	6	10.9
Ventral fin length	20	16.0	5	6.8	6	8.3	5	6.4	6	8.2	5	9.1
Body depth	31	24.8	13	17.9	13	18.2	13	16.9	13	17.8	11	20.4
Body width	21	16.6	9	11.6	10	13.2	10	12.2	9	11.6	7	12.0
Caudal-peduncle length	30	24.3	19	25.9	18	24.9	20	25.6	19	25.8	16	28.4
Caudal-peduncle depth	17	13.2	8	10.3	8	10.6	8	10.3	8	11.2	6	11.1
Weight (g)	44.3		4.6		5		6.7		6.1		2.8	
Meristic characters												
1 st dorsal fin rays	VII		VII		VII		*		VII		*	
2 nd dorsal fin rays	I + 10		I + 10		I + 10		I + 10		I + 9		I + 10	
Anal fin rays	II + 9		II + 9		II + 9		II + 9		II + 8		II + 9	
Pectoral fin rays	18		19		18		19		18		18	
Total gill rakers	29		29		30		30		30		28	
Scales lateral line	47		46		47		48		49		48	
Opercular membranous spines	4*		6		6		7		6		4	
Pyloric caeca	11		10		13		12		11		12	

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